FIG. 1

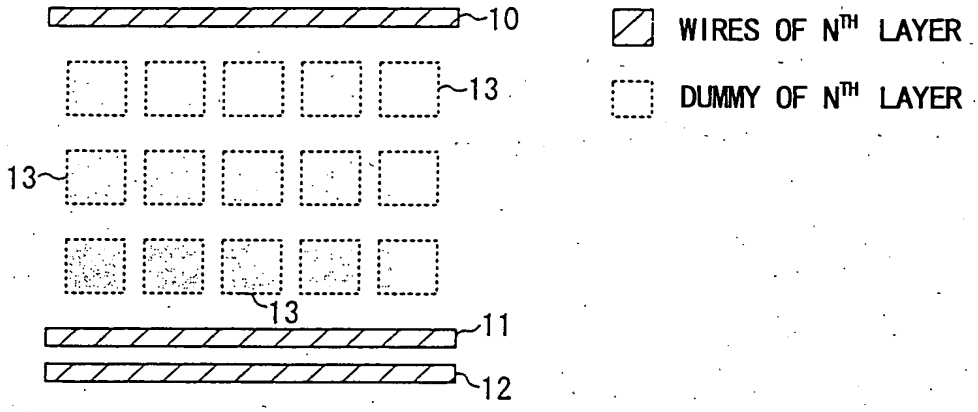

10
13
13
13
11
12
WIRES OF N^TH LAYER
DUMMY OF N^TH LAYER

FIG. 2

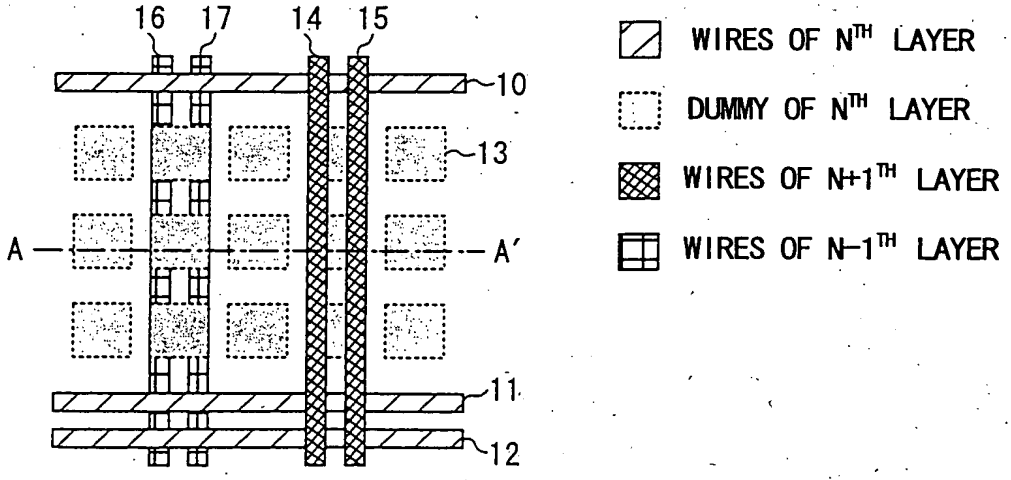

16
17
14
15
10
13
A
A'
11
12
WIRES OF N^TH LAYER
DUMMY OF N^TH LAYER
WIRES OF N+1^TH LAYER
WIRES OF N-1^TH LAYER

FIG. 3

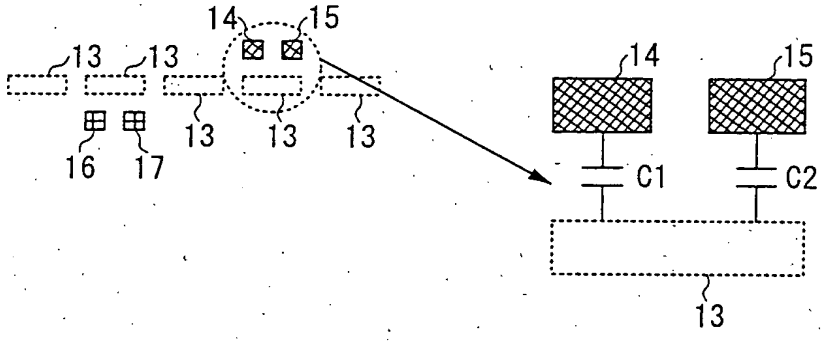

14
15
13
13
13
13
13
16
17
14
15
C1
C2
13

FIG. 4

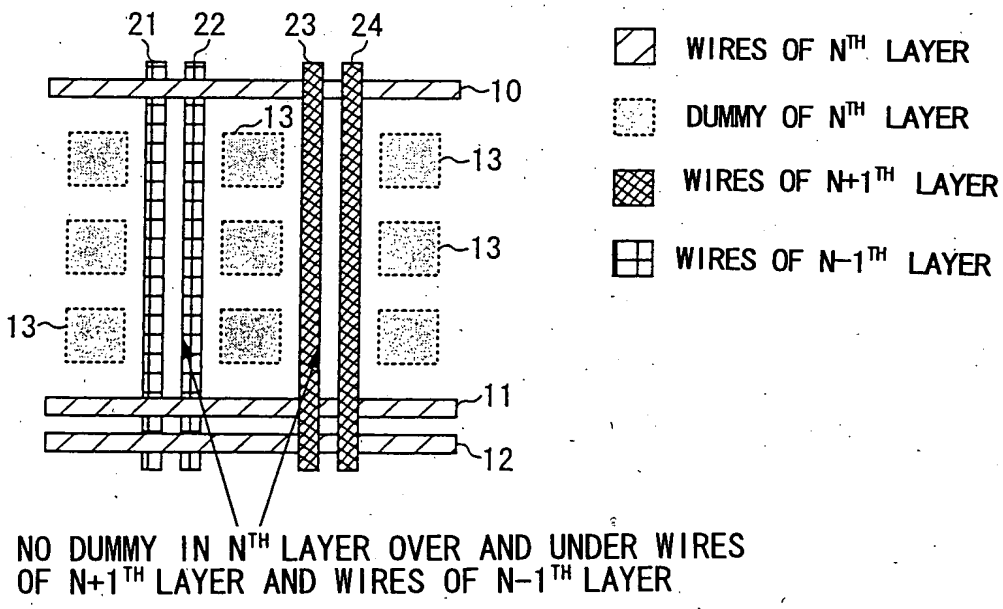

21
22
23
24
10
13
13
13
13
11
12
WIRES OF N^TH LAYER
DUMMY OF N^TH LAYER
WIRES OF N+1^TH LAYER
WIRES OF N-1^TH LAYER
NO DUMMY IN N^TH LAYER OVER AND UNDER WIRES OF N+1^TH LAYER AND WIRES OF N-1^TH LAYER

FIG. 5

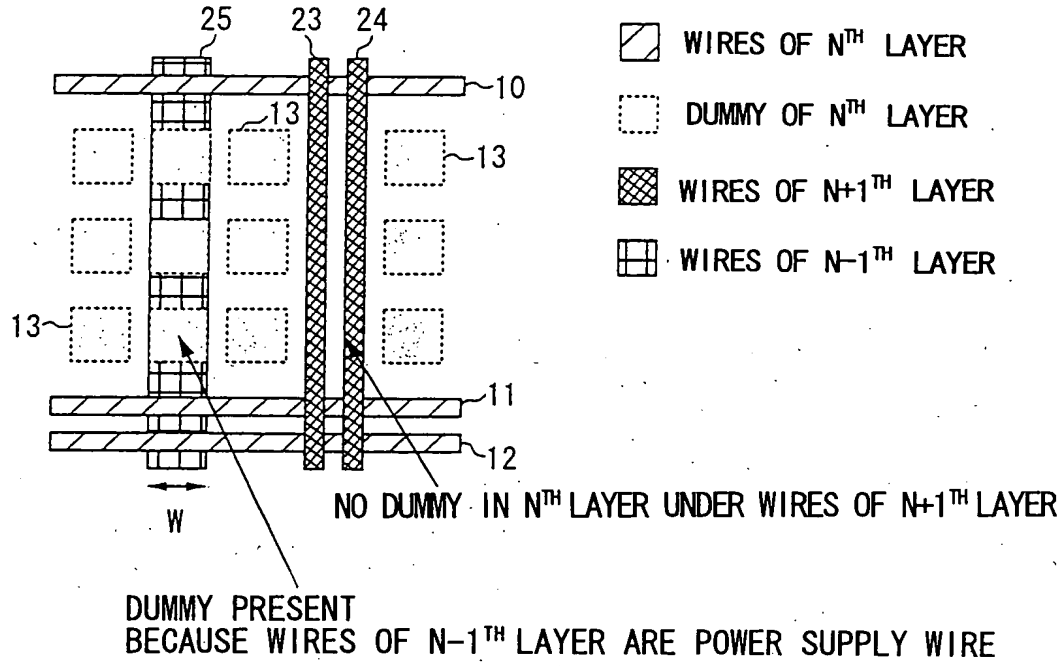

25
23
24
10
13
13
13
11
12
W
WIRES OF N^TH LAYER
DUMMY OF N^TH LAYER
WIRES OF N+1^TH LAYER
WIRES OF N-1^TH LAYER
NO DUMMY IN N^TH LAYER UNDER WIRES OF N+1^TH LAYER
DUMMY PRESENT
BECAUSE WIRES OF N-1^TH LAYER ARE POWER SUPPLY WIRE

FIG. 6

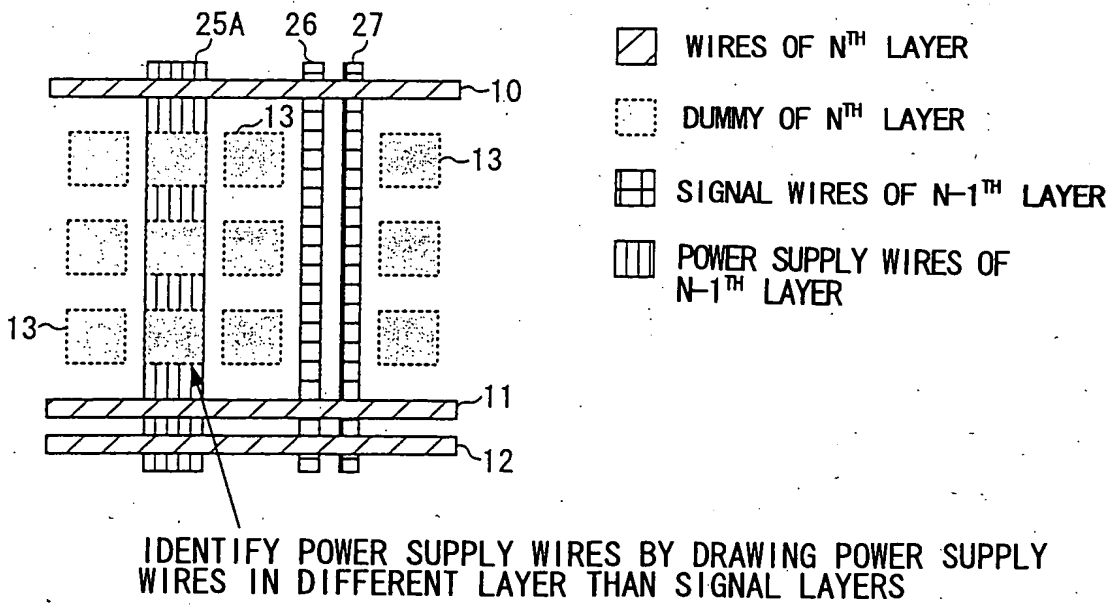

25A
26
27
10
13
13
13
11
12
WIRES OF N^TH LAYER
DUMMY OF N^TH LAYER
SIGNAL WIRES OF N-1^TH LAYER
POWER SUPPLY WIRES OF N-1^TH LAYER
IDENTIFY POWER SUPPLY WIRES BY DRAWING POWER SUPPLY WIRES IN DIFFERENT LAYER THAN SIGNAL LAYERS

FIG. 7

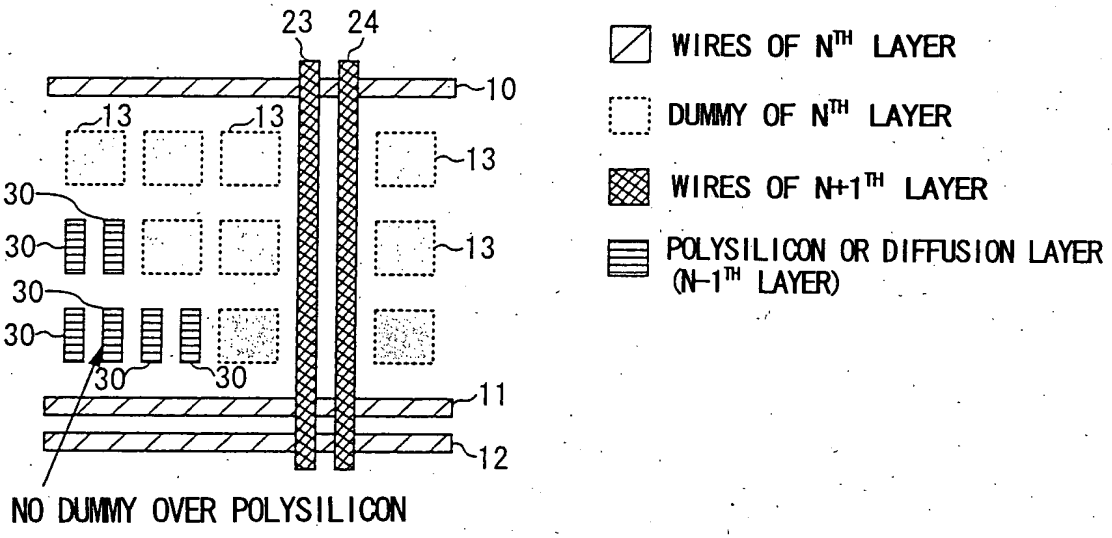

23
24
10
13
13
13
13
30
30
30
30
30
30
11
12
NO DUMMY OVER POLYSILICON
WIRES OF N^TH LAYER
DUMMY OF N^TH LAYER
WIRES OF N+1^TH LAYER
POLYSILICON OR DIFFUSION LAYER (N-1^TH LAYER)

FIG. 8

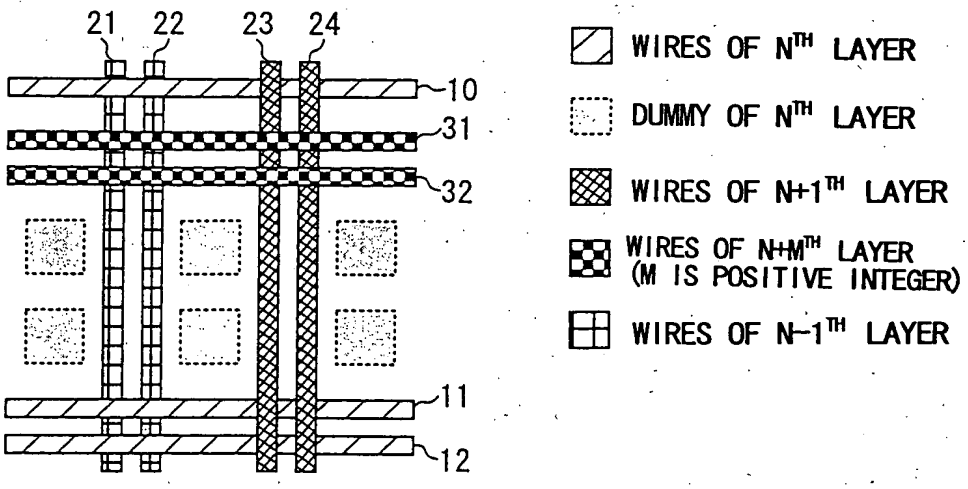

21
22
23
24
10
31
32
11
12
WIRES OF N^TH LAYER
DUMMY OF N^TH LAYER
WIRES OF N+1^TH LAYER
WIRES OF N+M^TH LAYER (M IS POSITIVE INTEGER)
WIRES OF N-1^TH LAYER

FIG. 9A

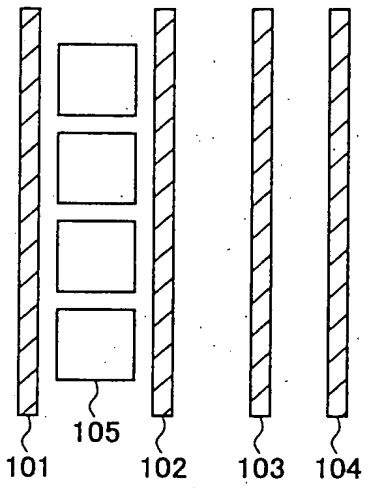


FIG. 9B

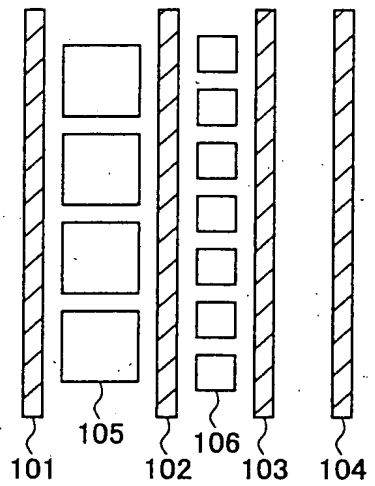


FIG. 9C

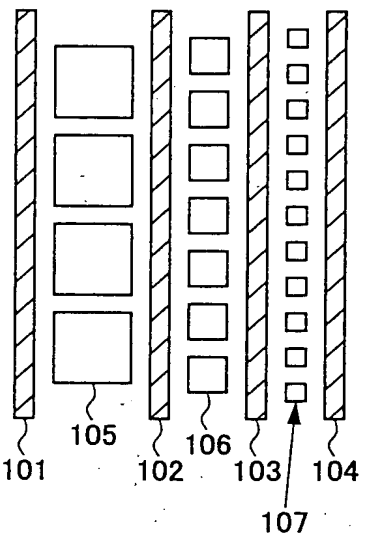


FIG. 10

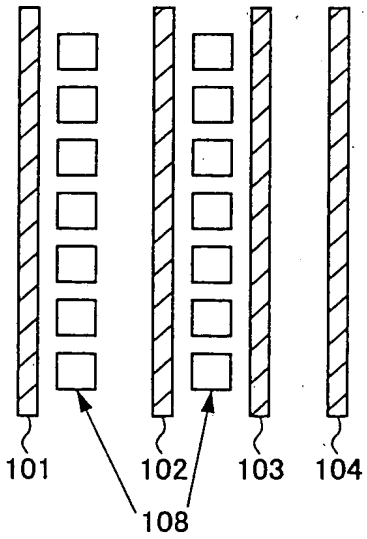


FIG. 14A

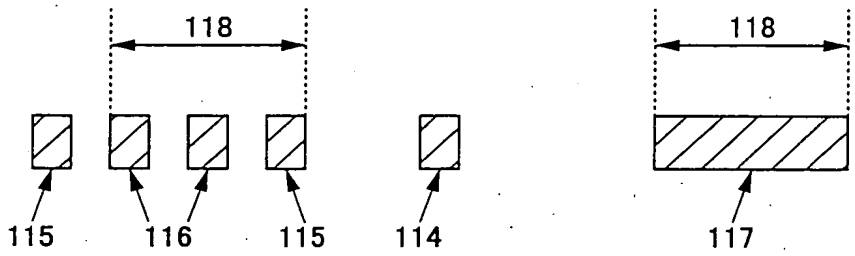


FIG. 14B

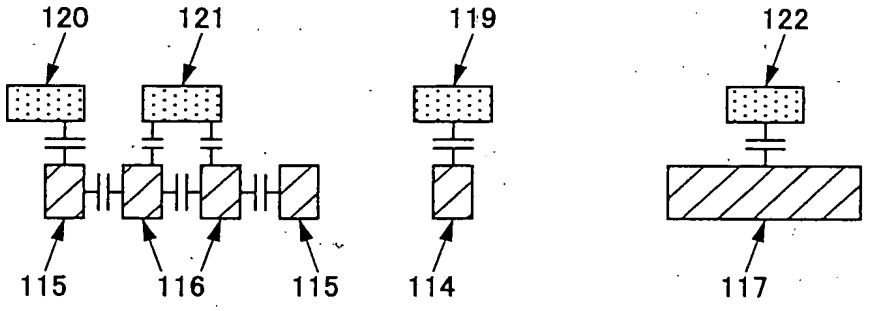


FIG.11

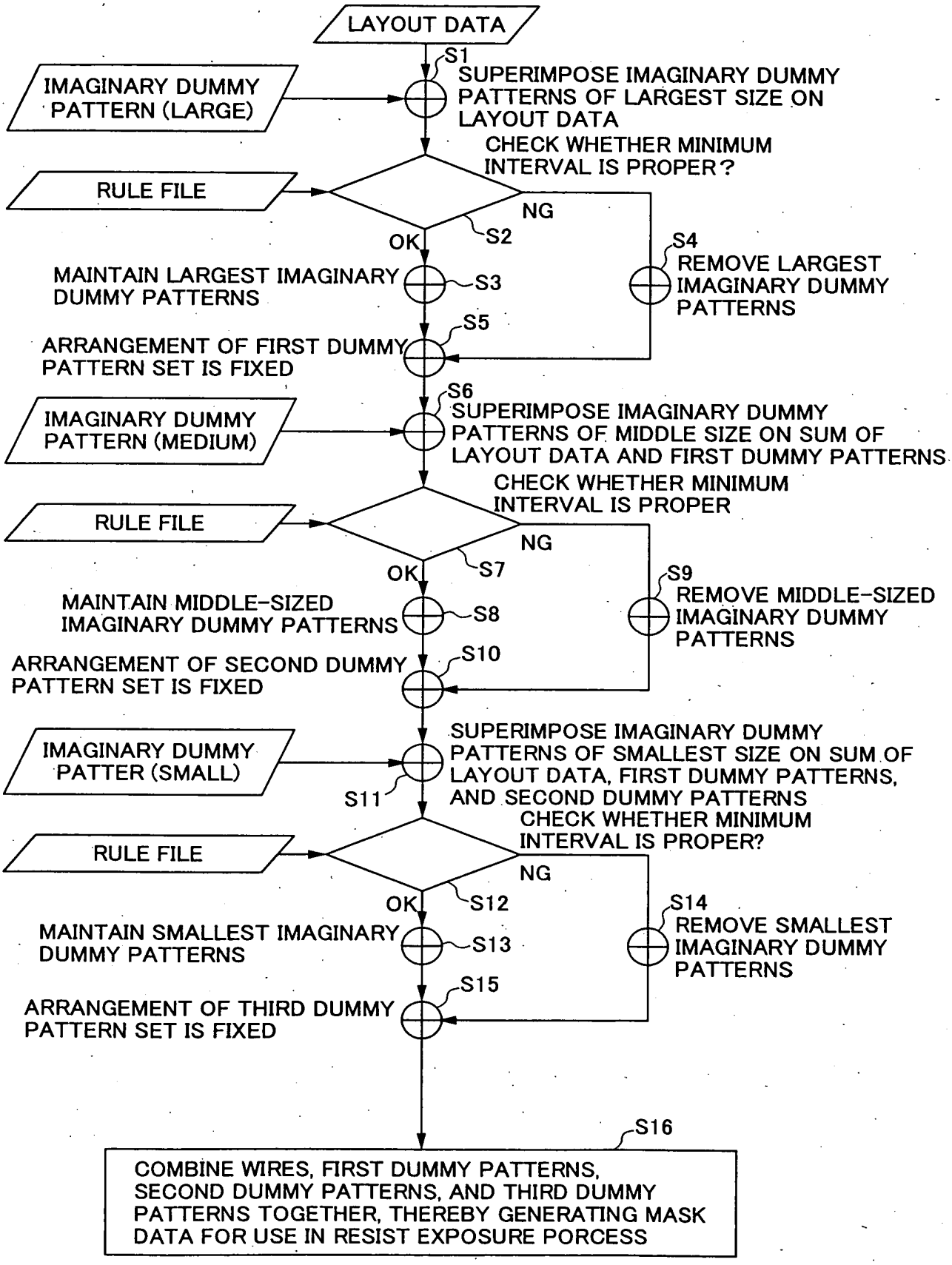

LAYOUT DATA
S1
IMAGINARY DUMMY PATTERN (LARGE)
SUPERIMPOSE IMAGINARY DUMMY PATTERNS OF LARGEST SIZE ON LAYOUT DATA
CHECK WHETHER MINIMUM INTERVAL IS PROPER?
RULE FILE
NG
S2
OK
S4
REMOVE LARGEST IMAGINARY DUMMY PATTERNS
MAINTAIN LARGEST IMAGINARY DUMMY PATTERNS
S3
S5
ARRANGEMENT OF FIRST DUMMY PATTERN SET IS FIXED
S6
IMAGINARY DUMMY PATTERN (MEDIUM)
SUPERIMPOSE IMAGINARY DUMMY PATTERNS OF MIDDLE SIZE ON SUM OF LAYOUT DATA AND FIRST DUMMY PATTERNS
CHECK WHETHER MINIMUM INTERVAL IS PROPER
RULE FILE
NG
S7
OK
S9
REMOVE MIDDLE-SIZED IMAGINARY DUMMY PATTERNS
MAINTAIN MIDDLE-SIZED IMAGINARY DUMMY PATTERNS
S8
S10
ARRANGEMENT OF SECOND DUMMY PATTERN SET IS FIXED
IMAGINARY DUMMY PATTER (SMALL)
SUPERIMPOSE IMAGINARY DUMMY PATTERNS OF SMALLEST SIZE ON SUM OF LAYOUT DATA, FIRST DUMMY PATTERNS, AND SECOND DUMMY PATTERNS
S11
CHECK WHETHER MINIMUM INTERVAL IS PROPER?
RULE FILE
NG
S12
OK
S14
REMOVE SMALLEST IMAGINARY DUMMY PATTERNS
MAINTAIN SMALLEST IMAGINARY DUMMY PATTERNS
S13
S15
ARRANGEMENT OF THIRD DUMMY PATTERN SET IS FIXED
S16
COMBINE WIRES, FIRST DUMMY PATTERNS, SECOND DUMMY PATTERNS, AND THIRD DUMMY PATTERNS TOGETHER, THEREBY GENERATING MASK DATA FOR USE IN RESIST EXPOSURE PORCESS

FIG. 12A

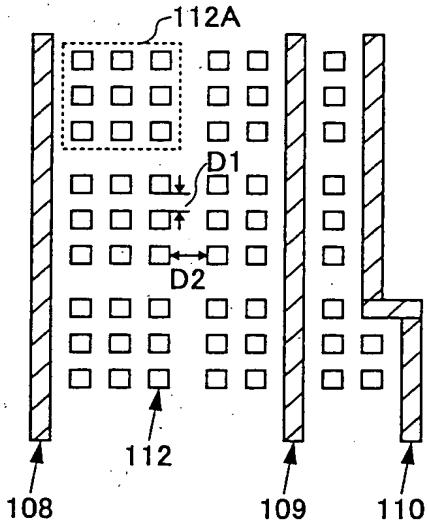


FIG. 12B

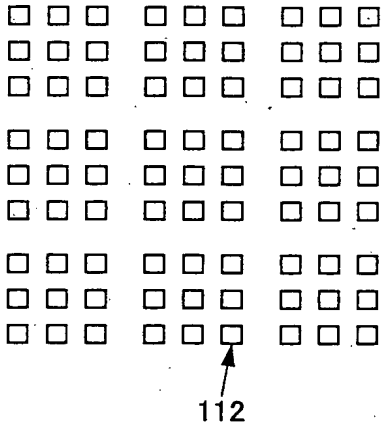


FIG. 12C

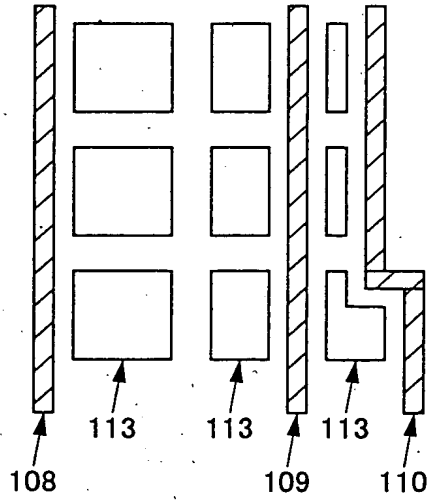


FIG.13

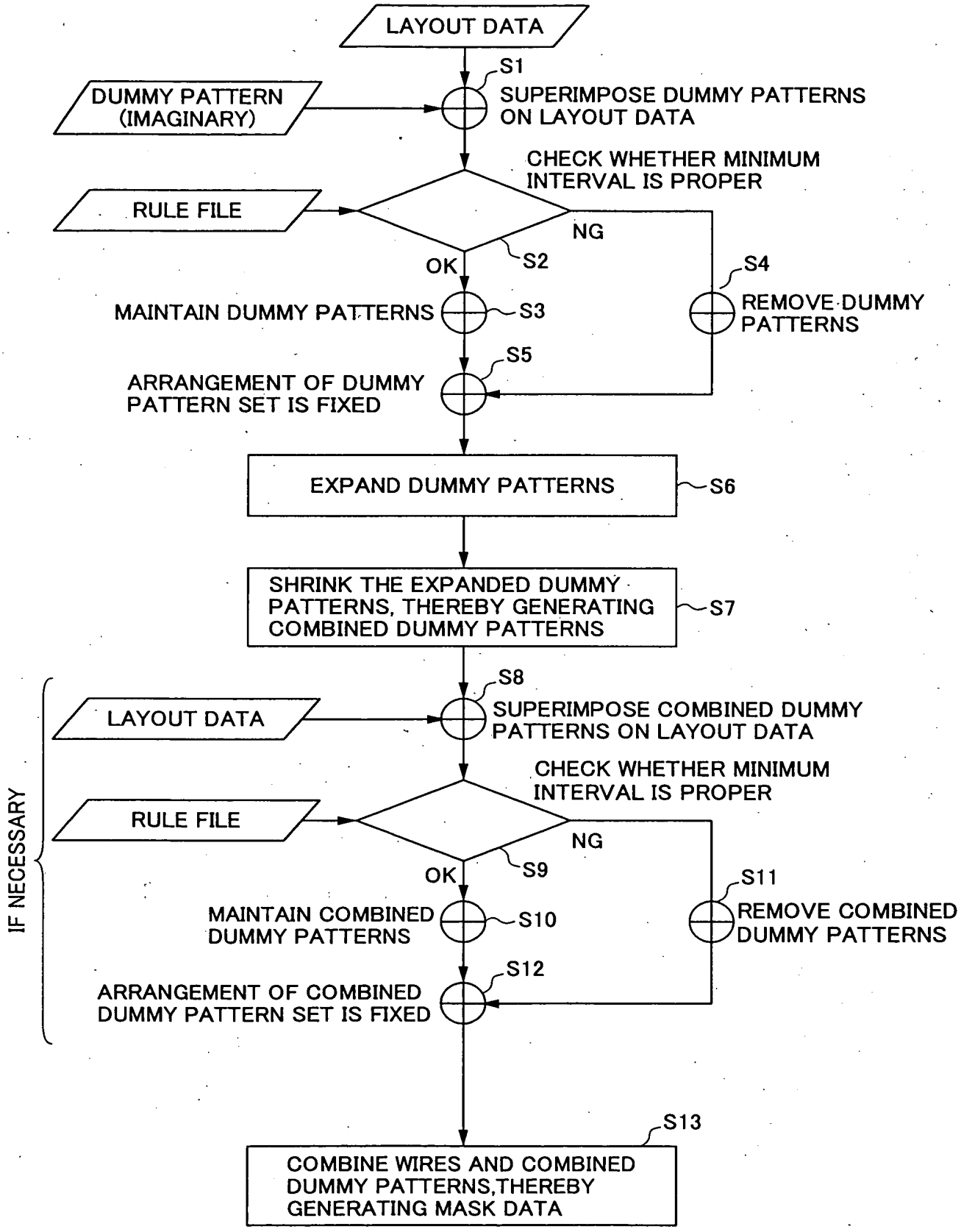

LAYOUT DATA
S1
DUMMY PATTERN (IMAGINARY)
SUPERIMPOSE DUMMY PATTERNS ON LAYOUT DATA
CHECK WHETHER MINIMUM INTERVAL IS PROPER
RULE FILE
NG
OK
S2
S4
MAINTAIN DUMMY PATTERNS
S3
REMOVE DUMMY PATTERNS
S5
ARRANGEMENT OF DUMMY PATTERN SET IS FIXED
EXPAND DUMMY PATTERNS
S6
SHRINK THE EXPANDED DUMMY PATTERNS, THEREBY GENERATING COMBINED DUMMY PATTERNS
S7
S8
LAYOUT DATA
SUPERIMPOSE COMBINED DUMMY PATTERNS ON LAYOUT DATA
CHECK WHETHER MINIMUM INTERVAL IS PROPER
RULE FILE
NG
OK
S9
S11
MAINTAIN COMBINED DUMMY PATTERNS
S10
REMOVE COMBINED DUMMY PATTERNS
S12
ARRANGEMENT OF COMBINED DUMMY PATTERN SET IS FIXED
IF NECESSARY
S13
COMBINE WIRES AND COMBINED DUMMY PATTERNS,THEREBY GENERATING MASK DATA

FIG.15

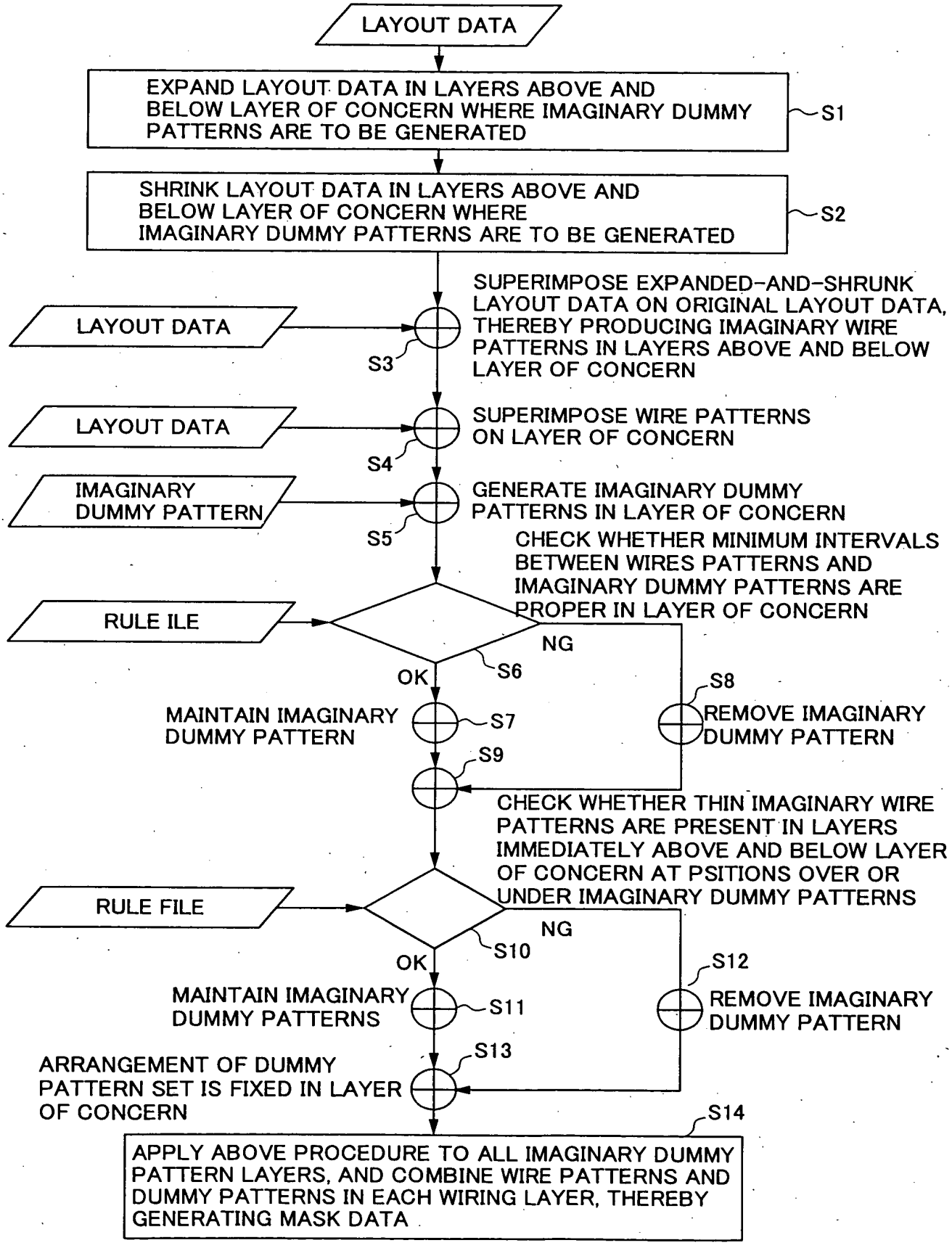

LAYOUT DATA
EXPAND LAYOUT DATA IN LAYERS ABOVE AND BELOW LAYER OF CONCERN WHERE IMAGINARY DUMMY PATTERNS ARE TO BE GENERATED
S1
SHRINK LAYOUT DATA IN LAYERS ABOVE AND BELOW LAYER OF CONCERN WHERE IMAGINARY DUMMY PATTERNS ARE TO BE GENERATED
S2
LAYOUT DATA
SUPERIMPOSE EXPANDED-AND-SHRUNK LAYOUT DATA ON ORIGINAL LAYOUT DATA, THEREBY PRODUCING IMAGINARY WIRE PATTERNS IN LAYERS ABOVE AND BELOW LAYER OF CONCERN
S3
LAYOUT DATA
SUPERIMPOSE WIRE PATTERNS ON LAYER OF CONCERN
S4
IMAGINARY DUMMY PATTERN
GENERATE IMAGINARY DUMMY PATTERNS IN LAYER OF CONCERN
S5
CHECK WHETHER MINIMUM INTERVALS BETWEEN WIRES PATTERNS AND IMAGINARY DUMMY PATTERNS ARE PROPER IN LAYER OF CONCERN
RULE ILE
NG
S6
OK
S8
MAINTAIN IMAGINARY DUMMY PATTERN
S7
REMOVE IMAGINARY DUMMY PATTERN
S9
CHECK WHETHER THIN IMAGINARY WIRE PATTERNS ARE PRESENT IN LAYERS IMMEDIATELY ABOVE AND BELOW LAYER OF CONCERN AT PSITIONS OVER OR UNDER IMAGINARY DUMMY PATTERNS
RULE FILE
NG
S10
OK
S12
MAINTAIN IMAGINARY DUMMY PATTERNS
S11
REMOVE IMAGINARY DUMMY PATTERN
S13
ARRANGEMENT OF DUMMY PATTERN SET IS FIXED IN LAYER OF CONCERN
S14
APPLY ABOVE PROCEDURE TO ALL IMAGINARY DUMMY PATTERN LAYERS, AND COMBINE WIRE PATTERNS AND DUMMY PATTERNS IN EACH WIRING LAYER, THEREBY GENERATING MASK DATA

FIG. 16

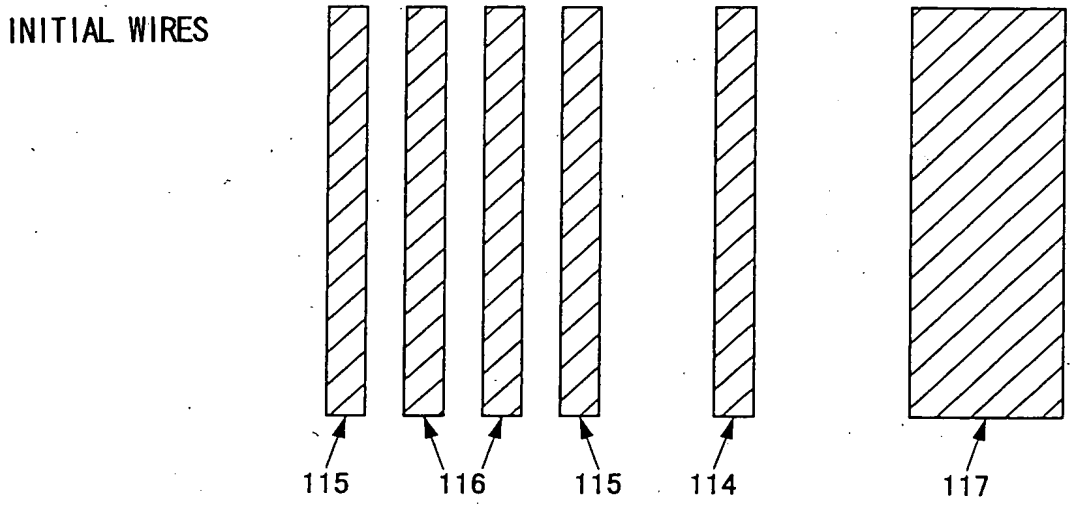

INITIAL WIRES
115
116
115
114
117

FIG. 17

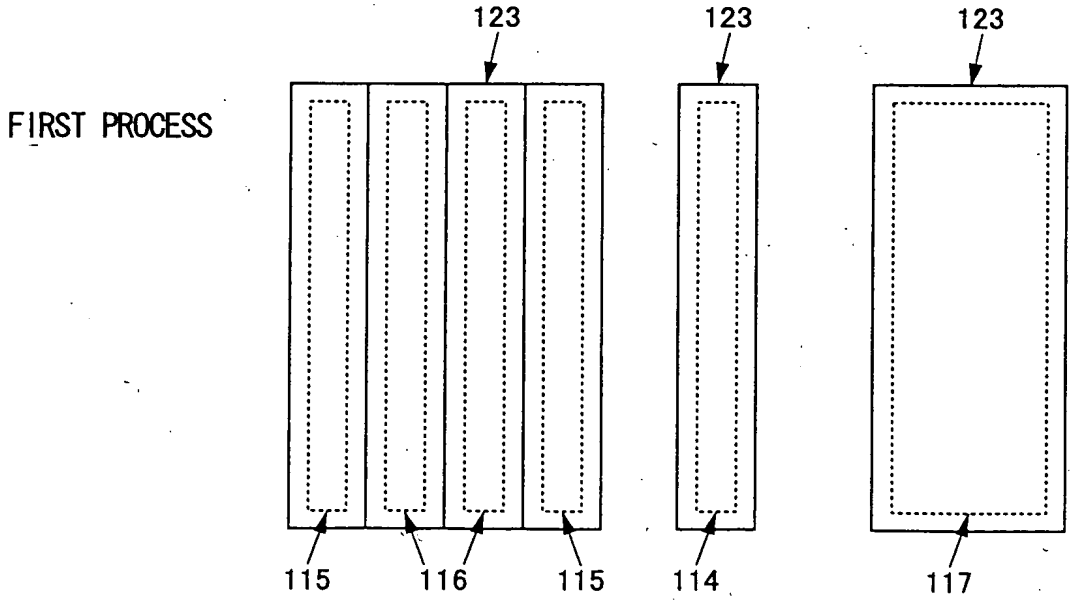

FIRST PROCESS
123
123
123
115
116
115
114
117

FIG. 18

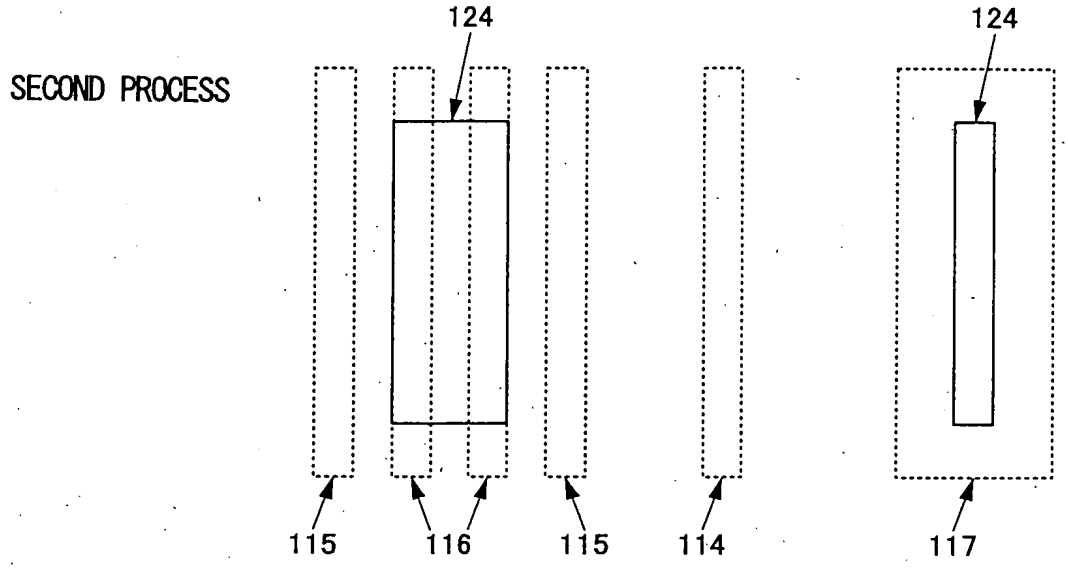

SECOND PROCESS
124
124
115
116
115
114
117

FIG. 19

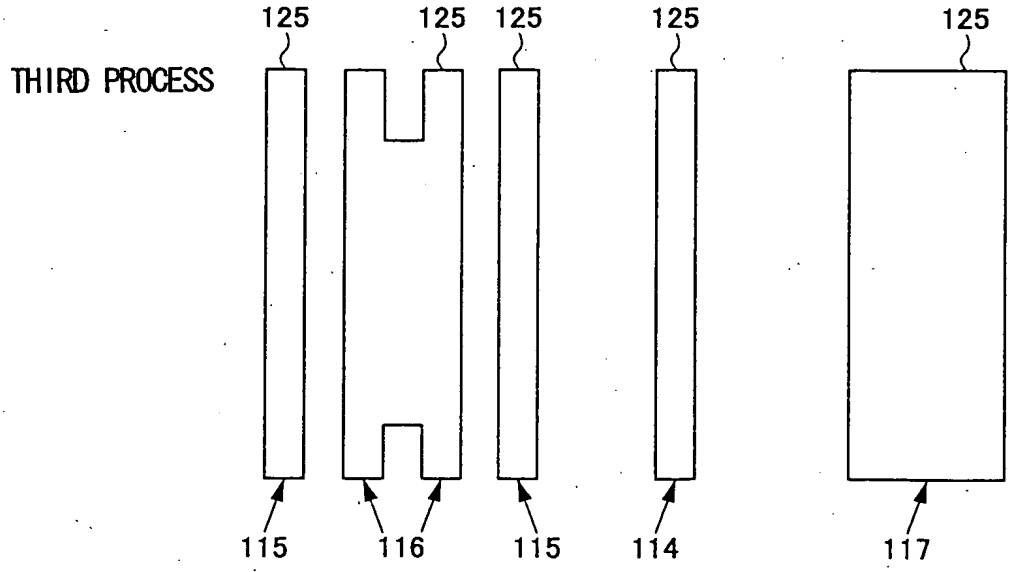

THIRD PROCESS
125
125
125
125
125
115
116
115
114
117

FIG. 20

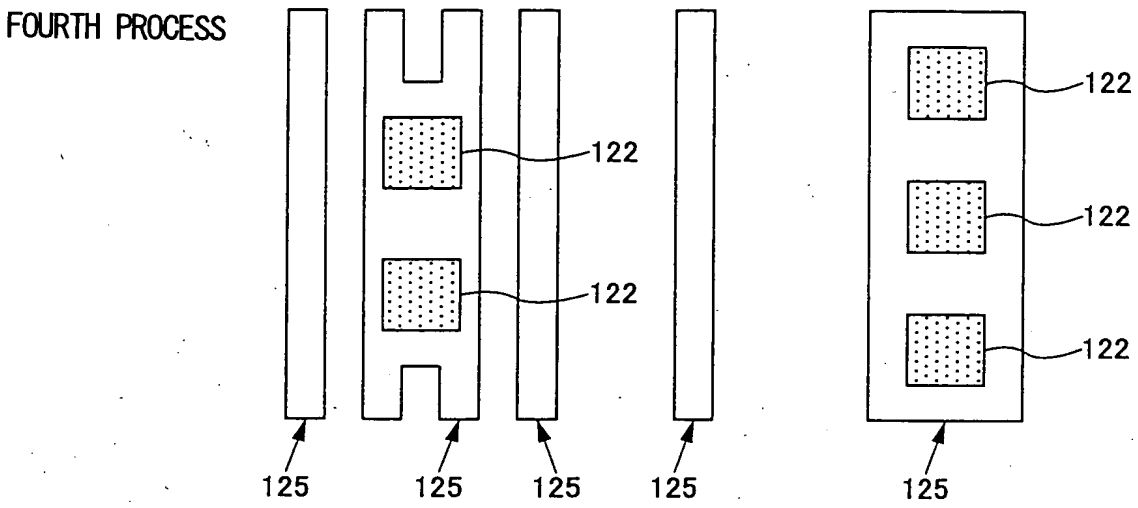

FOURTH PROCESS
122
122
122
122
122
125
125
125
125
125

FIG. 21

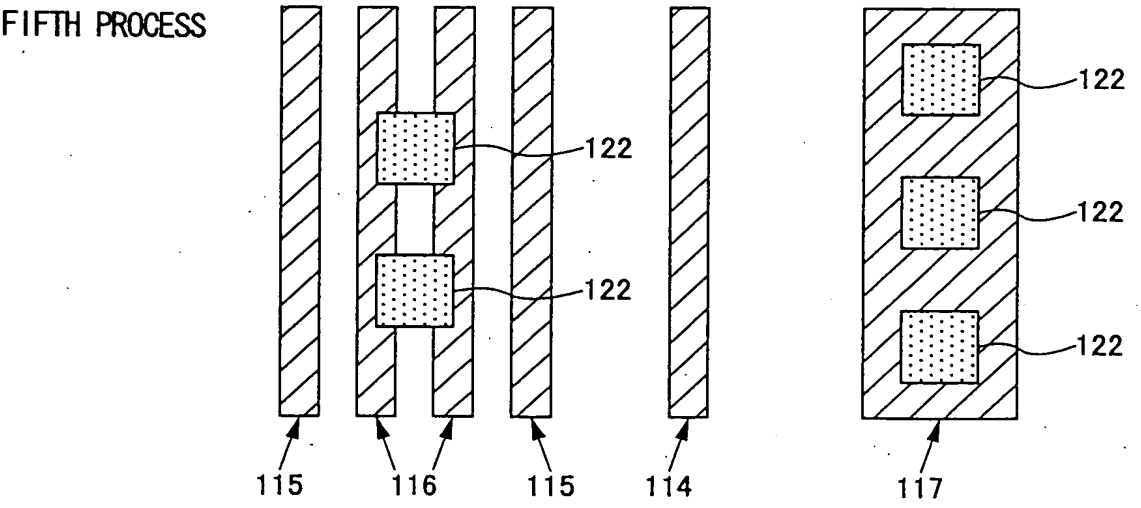

FIFTH PROCESS
122
122
122
122
122
115
116
115
114
117

FIG. 22

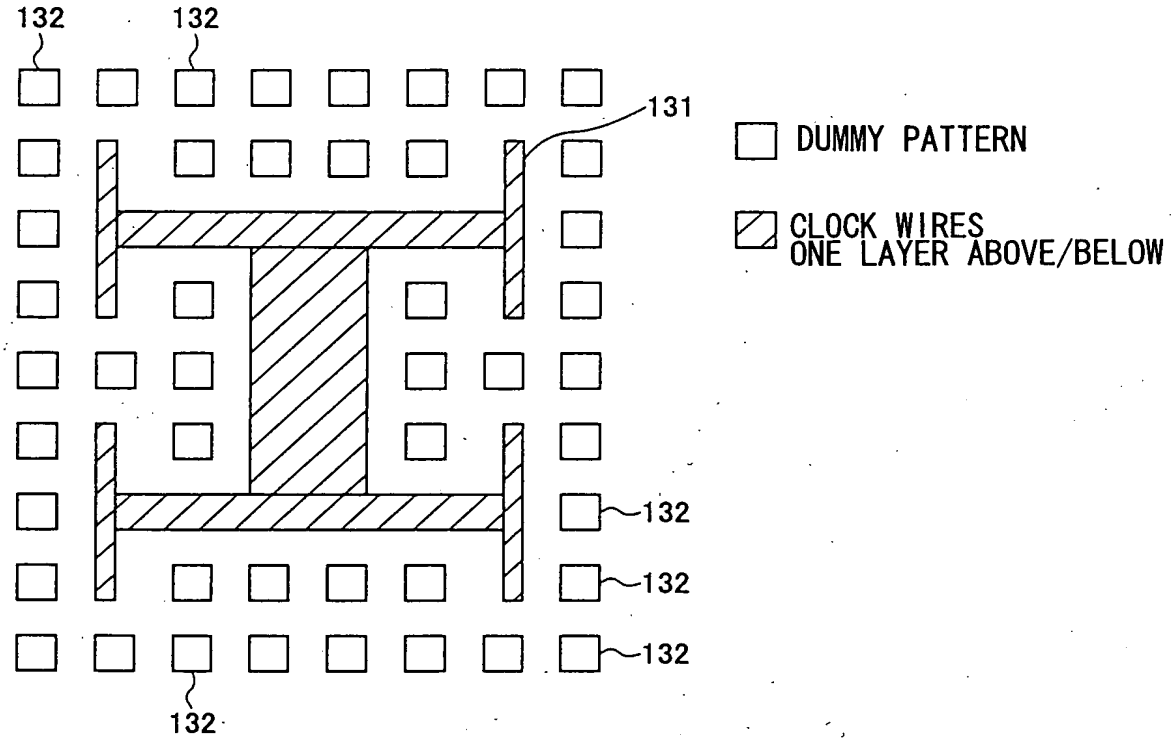

132
132
131
132
132
132
DUMMY PATTERN
CLOCK WIRES
ONE LAYER ABOVE/BELOW

FIG.23

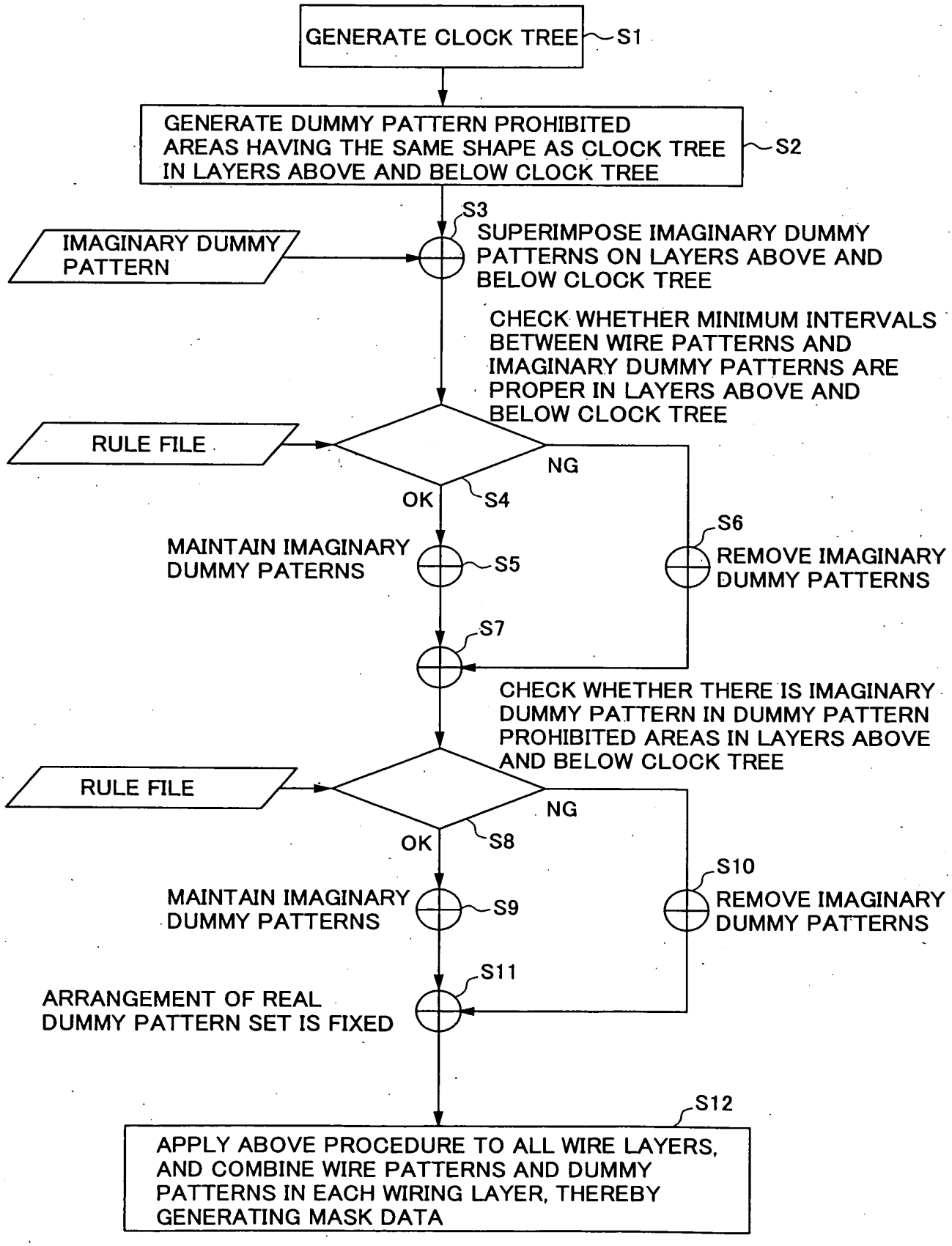
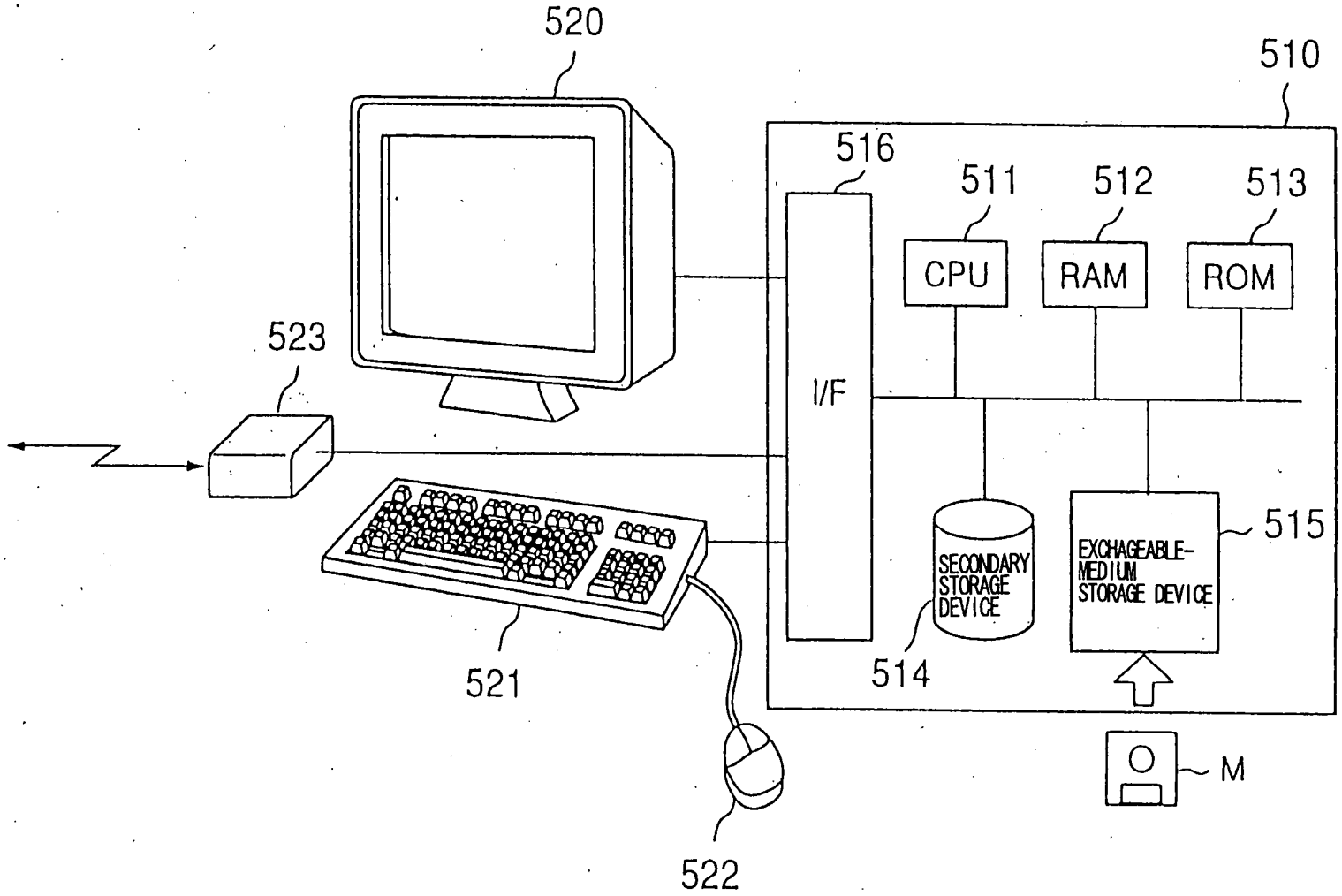

GENERATE CLOCK TREE
S1
GENERATE DUMMY PATTERN PROHIBITED AREAS HAVING THE SAME SHAPE AS CLOCK TREE IN LAYERS ABOVE AND BELOW CLOCK TREE
S2
S3
IMAGINARY DUMMY PATTERN
SUPERIMPOSE IMAGINARY DUMMY PATTERNS ON LAYERS ABOVE AND BELOW CLOCK TREE
CHECK WHETHER MINIMUM INTERVALS BETWEEN WIRE PATTERNS AND IMAGINARY DUMMY PATTERNS ARE PROPER IN LAYERS ABOVE AND BELOW CLOCK TREE
RULE FILE
NG
OK
S4
S6
MAINTAIN IMAGINARY DUMMY PATERNS
S5
REMOVE IMAGINARY DUMMY PATTERNS
S7
CHECK WHETHER THERE IS IMAGINARY DUMMY PATTERN IN DUMMY PATTERN PROHIBITED AREAS IN LAYERS ABOVE AND BELOW CLOCK TREE
RULE FILE
NG
OK
S8
S10
MAINTAIN IMAGINARY DUMMY PATTERNS
S9
REMOVE IMAGINARY DUMMY PATTERNS
S11
ARRANGEMENT OF REAL DUMMY PATTERN SET IS FIXED
S12
APPLY ABOVE PROCEDURE TO ALL WIRE LAYERS, AND COMBINE WIRE PATTERNS AND DUMMY PATTERNS IN EACH WIRING LAYER, THEREBY GENERATING MASK DATA

FIG. 24


520
510
516
511
512
513
CPU
RAM
ROM
523
I/F
SECONDARY STORAGE DEVICE
EXCHAGEABLE-MEDIUM STORAGE DEVICE
515
514
521
M
522